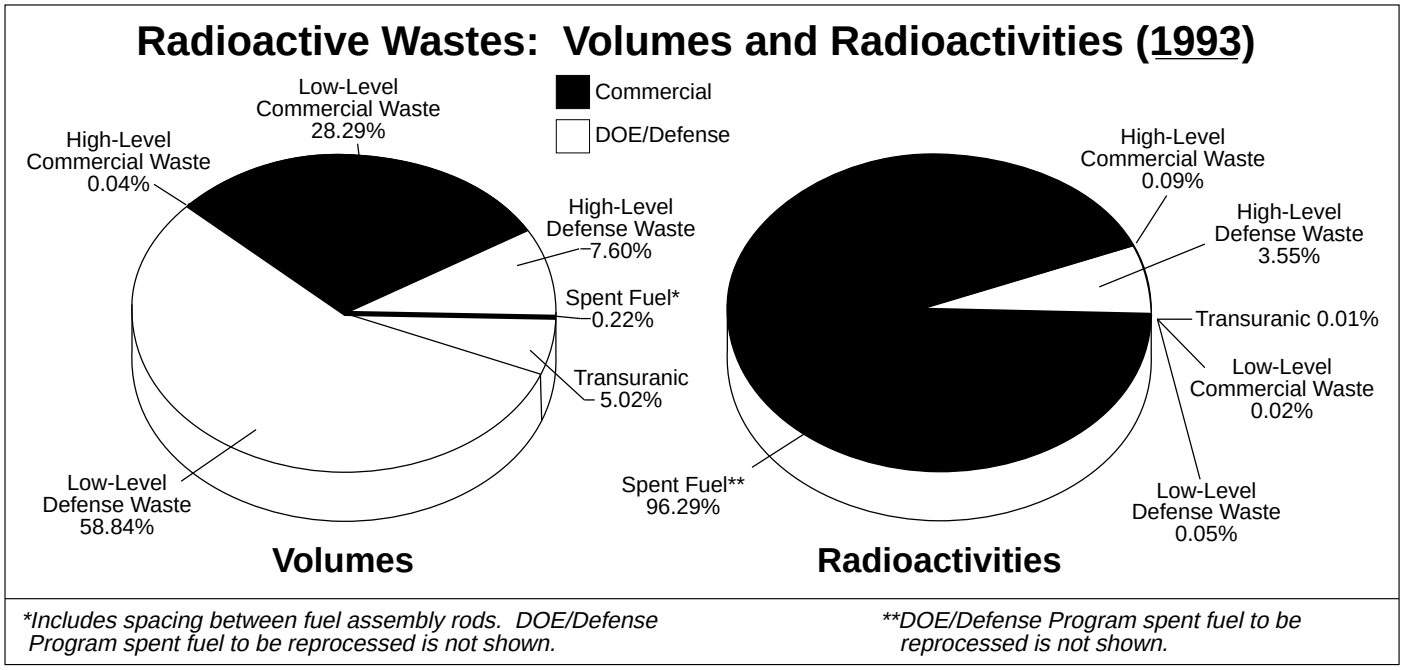


Directions: Using the information in the reading lesson and the pie charts above, answer the questions.

1. As of 1993, more than *(20%)* percent of our Nation's electricity was generated by nuclear powerplants.

2. What percentage of the total amount of radioactive waste is:
   a. low-level? *(58.84% + 28.29% = 87.13%)* b. high-level? *(0.04 + 7.60% = 7.64%)*
   c. spent fuel? *(0.22%)* d. transuranic? *(5.02%)*

3. What is the source of the greatest volume of high-level waste? *Defense* %? *(7.60%)*

4. What type of waste represents:
   a. the greatest amount of radioactivity? *(Spent fuel)* %? *(96.29%)*
   b. second greatest amount of radioactivity? *(Defense high-level waste)* %? *(3.55%)*

5. What two sources represent the least radioactivity?
   a. *(Transuranics)* %? *(0.01%)* b. *(Low-level commercial)* %? *(0.02%)*

6. a. Although spent fuel is *(0.22%)* of the accumulation of radioactive waste, it contains *(96.29%)* of the radioactivity.
   b. Low-level defense and commercial wastes represent *(87.13%)* of the volume of waste but only *(0.07%)* of the radioactivity.

7. What is the significance of the information in these pie charts?
   (Most radioactive waste is low-level and does not require disposal in a repository. A small percentage of the total volume of radioactive waste is high-level, transuranic, or spent fuel and requires permanent disposal in a repository. The small volume of spent fuel and defense high-level waste contains the greatest percentage of radioactivity.)

NUCLEAR WASTE: WHAT IS IT? WHERE IS IT?

A. In the blanks provided, write the number of the statement that best describes the terms that are listed. A response may be used only once. All responses will not be used.

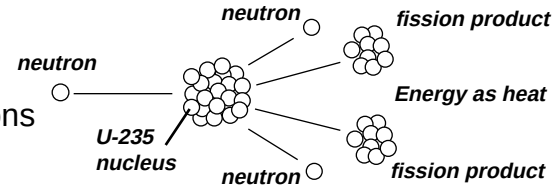
TERMS	ANSWERS
(4) A. Geologic Repository	1. byproduct from using radioactive material
(6) B. Spent Fuel	2. discarded protective clothing from "housekeeping" functions of commercial and university nuclear facilities
(7) C. Fuel Rods	3. depends on its origin, level of radioactivity, and potential hazard
(1) D. Nuclear Waste	4. deep underground facility
(2) E. Low-Level Waste	5. organization of States with purpose of providing for disposal of low-level waste from all members
(3) F. Classification of Waste	6. has been used in a nuclear reactor and doesn't contribute efficiently to the nuclear chain reaction
(5) G. Compact	7. hollow metal tubes containing nuclear powerplant fuel
	8. spent fuel and defense high-level waste that will be disposed of in a geologic repository

B. List the four categories of nuclear waste and give the source or sources for each type.

	Type	Sources	Planned Permanent Disposal Method
1.	*(High-Level)*	*(Spent fuel and defense high-level waste)*	*(Geologic repository)*
2.	*(Low-Level)*	*(Many commercial and industrial processes)*	*(Specially designed above-ground facilities or shallow land burial)*
3.	*(Transuranic)*	*(Manmade elements formed as a byproduct of operation of a nuclear reactor; most results from processing nuclear fuel as part of U. S. defense activities)*	*(Geologic repository)*
4.	*(Mill Tailings)*	*(Naturally radioactive rock and soil that are byproducts of mining and milling uranium)*	*(Covering with dirt)*

C. Arrange the following phrases in the correct order. Then draw a diagram that illustrates the sentence you have made.

causing the nucleus to split apart
a neutron
releasing energy, fission products, and more neutrons
strikes the nucleus of a uranium-235 atom



(A neutron strikes the nucleus of a uranium-235 atom and causes the nucleus to split apart, releasing energy, fission products, and more neutrons.)

D. Indicate whether each statement is true (T) or false (F) by writing the correct letter in the blank. If the statement is false, correct it to make it true.

(T) 1. The U.S. Department of Energy (DOE) is responsible for establishing a system for the disposal of high-level radioactive waste.

(T) 2. Mill tailings contain small amounts of radium that decay to radon, a radioactive gas.

(F) 3. Transuranics represent the most radioactive category of nuclear waste.

(F) 4. All radioactive waste must be handled by remote control from behind heavy shielding.

(F) 5. Nuclear fuel burns.

E. Complete each of the following sentences.

1. Nuclear waste requires special disposal because *(it is necessary to avoid possible health and environment hazards associated with radiation).*

2. The amended Nuclear Waste Policy Act directed the U.S. Department of Energy to perform site characterization on *(Yucca Mountain, Nevada)* as a candidate site for a geologic repository.

3. Some high-level waste may contain elements that decay very slowly and may remain radioactive for *(thousands)* of years.

4. In 1994, over 109 nuclear powerplants operating in 35 States generated more than *(20)* percent of the Nation's electricity.

5. Approximately 8,000 to 9,000 metric tons of defense high-level waste are currently stored at three DOE sites: the *(Savannah River Plant, SC)*; the *(Hanford Reservation, WA)*; and the *(Idaho National Engineering Laboratory, ID)*.

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